

**WHAT IS CLAIMED IS:**

1. An identifying nucleotide or identifying combination of nucleotides of 16s ribosomal RNA or 16s ribosomal DNA as set forth in Table 2 present in a *Shigella* species and not present in *E. coli*.

2. An identifying nucleotide or identifying combination of nucleotides of 16s ribosomal RNA or 16s ribosomal DNA as set forth in Table 2 present in *E. coli* and not present in a *Shigella* species.

3. An identifying nucleotide or identifying combination of nucleotides of 16s ribosomal RNA or 16s ribosomal DNA as set forth in Table 2 present in one species selected from the group consisting of *Shigella sonnei*, *Shigella flexneri*, *Shigella boydii*, and *Shigella dysenteriae*, and not present in the other species of *Shigella* and not present in *E. coli*.

4. The nucleotide or combination of nucleotides of Claim 1 or 3 present in *Shigella sonnei*.

5. The nucleotide or combination of nucleotides of Claim 4 wherein the identifying nucleotide is a C at position 964 or a deletion at position 978.

6. The nucleotide or combination of nucleotides of Claim 1 or 3 present in *Shigella dysenteriae*.

7. The nucleotide or combination of nucleotides of Claim 6 wherein the identifying nucleotide is an A at position 76.

8. The nucleotide or combination of nucleotides of Claim 1 or 3 present in *Shigella boydii*.

9. The nucleotide or combination of nucleotides of Claim 8 wherein the identifying nucleotide is a C at position 92.

10. The nucleotide or combination of nucleotides of Claim 2 wherein the identifying nucleotide is a T at position 88p.

11. A purified nucleic acid molecule capable of hybridizing to a 16s rRNA region or a 16s rDNA region having a genus-specific nucleotide of *Shigella* and not to an equivalent 16s rRNA region or 16s rDNA region of *E. coli*, or a nucleic acid molecule complementary to said molecule, the molecule thereby capable of distinguishing *Shigella* from *E. coli*.

12. A purified nucleic acid molecule capable of hybridizing to a 16s rRNA region or a 16s rDNA region having a genus-specific nucleotide of *E. coli* and not to an equivalent 16s rRNA region or 16s rDNA region of a *Shigella* species, or a nucleic acid molecule complementary to said molecule, the molecule thereby capable of distinguishing *E. coli* from *Shigella* species.

13. A purified nucleic acid molecule capable of hybridizing to a 16s rRNA region or a 16s rDNA region having a *Shigella sonnei*-, *Shigella flexneri*-, *Shigella boydii*-, or *Shigella dysenteriae*-specific nucleotide, and not to an equivalent 16s rRNA region or 16s rDNA region of the other *Shigella* species, or a nucleic acid molecule complementary to said molecule, the molecule thereby capable of distinguishing *Shigella* species.

14. The molecule of Claim 13 wherein the region has a *Shigella sonnei*-specific nucleotide selected from the group consisting of a C at position 964, and a deletion at position 978, the molecule thereby capable of distinguishing *Shigella sonnei*.

15. The molecule of Claim 13 wherein the region has a *Shigella dysenteriae*-specific nucleotide A at position 76, the molecule thereby capable of distinguishing *Shigella dysenteriae*.

16. The molecule of Claim 13 wherein the region has a *Shigella boydii*-specific nucleotide C at position 92, the molecule thereby capable of distinguishing *Shigella boydii*.

17. A first and a second purified nucleic acid molecule combination, the first capable of hybridizing to a first 16s rRNA region or 16s rDNA region as set forth in Table 2, the second

capable of hybridizing to a second 16s rRNA region or 16s rDNA region as set forth in Table 2, the combination of molecules thereby capable of distinguishing *E. coli*, or a *Shigella* species, or a nucleic acid molecule combination complementary to said first and second molecules.

18. The combination of nucleic acid molecules of Claim 13 wherein the first molecule hybridizes to a *Shigella flexneri* region containing a G nucleotide at position 79, and the second molecule hybridizes to *Shigella flexneri* region containing a G nucleotide at position 89 or to *Shigella flexneri* region containing a C nucleotide at position 92p.

19. A purified nucleic acid molecule having a nucleotide sequence as set forth in SEQ ID NO: 3, SEQ ID NO: 4, SEQ ID NO: 5, or SEQ ID NO: 6, or a nucleic acid complementary to said purified molecule.

20. A purified nucleic acid molecule having a nucleotide sequence as set forth in SEQ ID NO: 9, SEQ ID NO: 10, SEQ ID NO: 11, SEQ ID NO: 12, SEQ ID NO: 14, SEQ ID NO: 16, SEQ ID NO: 17, SEQ ID NO: 18, SEQ ID NO: 19, SEQ ID NO: 20, or SEQ ID NO: 21; or a nucleic acid molecule complementary to said purified molecule.

21. A method for testing an unknown sample suspected of having *E. coli* or *Shigella* species presence comprising  
demonstrating an identifying nucleotide or identifying combination of nucleotides of 16s rRNA or 16s rDNA as set forth in Table 2 within the sample  
wherein the demonstration of an identifying nucleotide or identifying combination of nucleotides establishes presence or absence of *E. coli* or *Shigella* in the sample.

22. The method of Claim 21 wherein the demonstrating is by a method selected from the group consisting of direct sequencing, dot blot hybridization, solution hybridization, Northern blotting, and Southern blotting of the unknown sample.

23. The method of Claim 21 wherein the unknown sample is suspected of containing *E. coli* and the identifying nucleotide is a T at position 88p.

24. The method of Claim 21 wherein the unknown sample is suspected of containing *Shigella sonnei* and the identifying nucleotide is a C at position 964, or a deletion at position 978.

25. The method of Claim 21 wherein the unknown sample is suspected of containing *Shigella dysenteriae* and the identifying nucleotide is an A at position 76.

26. The method of Claim 21 wherein the unknown sample is suspected of containing *Shigella boydii* and the identifying nucleotide is a C at position 92.

27. The method of Claim 21 wherein the unknown sample is suspected of containing *Shigella flexneri* and the identifying nucleotide is a G nucleotide at position 79 in combination with a G at position 89 or a C at position 92p.

28. The method of Claim 21 wherein the unknown sample is a clinical sample for diagnosis.

29. The method of Claim 21 wherein the unknown sample is a food sample.

30. The method of Claim 21 wherein the unknown sample is an environmental sample.

31. An assay kit for distinguishing *Shigella* from *E. coli* comprising the purified nucleic acid molecule of Claim 11 packaged in at least one container.

32. An assay kit for distinguishing *E. coli* from *Shigella* comprising the purified nucleic acid molecule of Claim 12 packaged in at least one container.

